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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-3271A
Plant ID No.:	041-00076
Applicant:	Atlantic Coast Pipeline, LLC
Facility Name:	Marts Compressor Station
Location:	Near Jane Lew, Lewis County
SIC/NAICS Code:	4922/486210
Application Type:	Class II Administrative Update
Received Date:	March 20, 2017
Engineer Assigned:	Joe Kessler
Fee Amount:	$1,300
Date Received:	March 22, 2017
Complete Date:	March 20, 2017
Due Date:	May 19, 2017
Applicant's Ad Date:	March 22, 2017
Newspaper:	*The Weston Democrat*
UTM's:	545.53 km Easting • 4,332.66 km Northing • Zone 17
Latitude/Longitude:	39.13944/-80.46556
Description:	Replacement of permitted 2,098 horsepower (hp) emergency generator (EG-1) with two (2) smaller 1,114 hp emergency generators, increase in the size of two storage tanks (TK-1 and TK-3), and update of fugitive emissions associated with piping losses (FUG-02).

DESCRIPTION OF PROCESS/MODIFICATIONS

Existing Facility

On July 21, 2017, Atlantic Coast Pipeline, LLC (ACP) received Permit Number R13-3271 for the construction and operation of the Marts Compressor Station located approximately 4.2 miles west-northwest of Jane Lew, WV south of State Route (SR) 35 (Kincheloe Run Road). ACP (a company jointly owned by Dominion Resources, Duke Energy, Piedmont Natural Gas, and AGL

Resources) stated the station was to be used to transport natural gas along a proposed 556-mile long interstate pipeline system designed to move the gas from West Virginia to North Carolina and Virginia. The station was permitted for four (4) Solar Combustion Turbines (20,500 brake-horsepower (bhp), 15,900 bhp, 10,915 bhp, and 7,700 bhp), one (1) 2,098 hp 4-Stroke Lean Burn (4SLB) natural gas-fired Caterpillar G3516C Emergency Generator (1,500 kW_e), and three (3) ancillary liquid storage tanks.

Proposed Modifications

ACP is now requesting to make the following changes:

- Replace the existing permitted 2,098 hp 4SLB natural gas-fired Caterpillar G3516C Emergency Generator (EG-1) with two (2) natural gas-fired 1,114 hp 4SLB Caterpillar G3512 Emergency Generators (EG-1 and EG-2);

- Increase the size of the permitted Pipeline Liquids Tank (TK-1) from 2,500 gallons to 3,000 gallons and the Aqueous Ammonia Tank (TK-3) from 8,000 gallons to 13,000 gallons; and

- Revise the fugitive emissions from the piping components (FUG-02) to account for a typographical error in the original permit application (R13-3271) that inadvertently double-counted fugitive emissions of compressor blowdowns that were calculated under FUG-01.

SITE INSPECTION

On November 18, 2015, the writer conducted an inspection of the proposed location of the Marts Compressor Station. The proposed Marts site is located in a rural area of Lewis County approximately 4.2 miles west-northwest of Jane Lew, WV south of State Route (SR) 35 (Kincheloe Run Road). This facility has not yet received an inspection from the DAQ Compliance/Enforcement Section.

AIR EMISSIONS AND CALCULATION METHODOLOGIES

The following will summarize the methodologies used by ACP to calculate the potential-to-emit (PTE) of the emission units proposed as new or modified in this permitting action.

Emergency Generator

Potential emissions from the two (2) new 1,114 hp 4SLB Caterpillar G3512 Emergency Generators (EG-1 and EG-2) were based on emission factors provided by the engine vendor, and as given in AP-42, Section 3.2 (AP-42 is a database of emission factors maintained by USEPA). Hourly emissions were based on the (as calculated using a fuel heat rating of 7,075 Btu/hp-hr) maximum design heat input (MDHI) of the engines of 7.88 mmBtu/hr and the maximum hp rating. Annual emissions were based on 100 hours of operation per year. The following table details the PTE of each emergency generator:

Table 1: Per-Emergency Generator PTE

Pollutant	Emission Factor	Source	Hourly (lb/hr)	Annual (ton/yr)
CO	1.86 g/hp-hr	Engine Vendor	4.57	0.23
NO_X	2.00 g/hp-hr	Engine Vendor	4.91	0.25
$PM_{2.5}/PM_{10}/PM^{(1)}$	9.91×10^{-3} lb/mmBtu	AP-42, Table 3.2-2	0.08	0.004
SO_2	5.88×10^{-4} lb/mmBtu	AP-42, Table 3.2-2	0.005	0.0002
VOCs	0.44 g/hp-hr	Engine Vendor	1.08	0.05
Total HAPs	Various	AP-42, Table 3.2-2	0.66	0.03
Formaldehyde	0.17 g/hp-hr	Engine Vendor	0.42	0.02

(1) Includes condensables.

Storage Tanks

ACP provided an estimate of the uncontrolled VOC emissions produced from the revised 3,000 gallon pipeline liquids storage tank (TK-1) using E&P TANKS and based on a higher annual throughput of 15,000 gallons per year (the previous emission estimate was based on 12,000 gal/yr). E&P TANKS is computer-based software designed to use site-specific information to predict emissions from petroleum storage tanks. The E&P TANKS output sheet was included in the permit application. As ammonia is not a regulated pollutant, no revised emissions estimate was provided for TK-2.

Truck Loadouts

VOC emissions from the revised (now based on an annual throughput of 15,000 gal/yr) pipeline liquid loading operations (LR-1) occur as fugitive emissions generated by displacement of vapors when loading trucks. The emission factor used to generate the VOC emissions is based on Equation (1) of AP-42 Section 5.2-4. In this equation, ACP used variables specific to the liquids loaded and to the method of loading - in this case "submerged loading: dedicated normal service." As stated above, worst-case annual emissions were based on a maximum revised loading rate of 15,000 gal/year of pipeline liquids. A conservative value of 20% was used to calculate the VOC percentage of the fluids. The increase in emissions from this increase in annual throughput was nominal (0.0012 tons/year).

Fugitive Emissions

As noted above, ACP included a revised estimate for piping component fugitive losses (FUG-02) that removed the compressor blowdowns from that emission unit as those emissions were previously calculated under the fugitive emissions calculations specific to blowdowns (FUG-01).

Emissions Summary

Based on the above estimation methodology as submitted in Attachment N of the permit application, the revised facility-wide PTE of the Marts Compressor Station is given in Attachment A. The change in annual facility-wide PTE as a result of the modifications evaluated herein is given in the following table:

Table 2: Change in Facility-Wide Annual PTE (in tons/year)

Pollutant	R13-3271[1]	R13-3271A	Change
CO	70.58	70.59	0.01
NO_X	42.16	42.54	0.38
$PM_{2.5}/PM_{10}/PM$	42.93	42.94	0.01
SO_2	7.08	7.08	0.00
VOCs	56.01	29.78	-26.23
Total HAPs	6.62	5.22	-1.40

(1) Emissions taken from R13-3271 Fact Sheet Attachment A.

REGULATORY APPLICABILITY

This section will address the potential regulatory applicability/non-applicability of substantive state and federal air quality rules relevant to the emission units/sources added or modified at the Marts Compressor Station.

45CSR13: Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation

The proposed changes to the Marts Compressor Station will increase the PTE of a regulated pollutant (see Table 2 above). However, the increase in PTE is below six (6) lbs/hour and ten (10) TPY of any regulated pollutant that would, pursuant to §45-13-2.17, define the change as a "modification" under 45CSR13. Therefore, pursuant to §45-13-4.2(b)(1), ACP is requesting a Class II Administrative Update to make a "[c]hange in a permit condition as necessary to allow changes in operating parameters, emission points, control equipment or any other aspect of a source which results in an increase . . . of any existing regulated air pollutant . . . "

As required under §45-13-8.3 ("Notice Level A"), ACP placed a Class I legal advertisement in a "newspaper of *general circulation* in the area where the source is . . . located." The ad ran on March 22, 2017 in *The Weston Democrat* and the affidavit of publication for this legal advertisement was submitted on March 27, 2017.

45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration - (NON APPLICABILITY)

The Marts Compressor Station is located in Lewis County, WV. Lewis County is classified as "in attainment" with all National Ambient Air Quality Standards. Therefore, as the facility is not a "listed source" under §45-14-2.43, the individual major source applicability threshold for all pollutants is 250 TPY. As given in Attachment A, the revised facility-wide PTE of the Marts Compressor Station is less than 250 TPY for all criteria pollutants. Therefore, the facility is not defined as a "major stationary source" under either 45CSR14 and the rule does not apply.

45CSR30: Requirements for Operating Permits

45CSR30 provides for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. The modified Marts Compressor Station does not meet the definition of a "major source under §112 of the Clean Air Act" as outlined under §45-30-2.26 and clarified (fugitive policy) under 45CSR30b. The revised facility-wide PTE (see Attachment A) of any regulated pollutant does not exceed 100 TPY. Additionally, the revised facility-wide PTE does not exceed 10 TPY of any individual HAP or 25 TPY of aggregate HAPs.

However, as the facility is subject to two New Source Performance Standard (NSPS) - 40 CFR 60, Subpart JJJJ and Subpart OOOO - and one Maximum Achievable Control Technology (MACT) rules - 40 CFR 63, Subpart ZZZZ, the facility would, in most cases, be subject to Title V as a "deferred source." However, pursuant to §60.4230(c), §60.5370(c), and §63.6585(d) as a non-major "area source," ACP is not required to obtain a Title V permit for the modified facility. Therefore, the Marts Compressor Station remains not subject to 45CSR30.

40 CFR 60, Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984 - (NON APPLICABILITY)

Pursuant to §60.110b, 40 CFR 60, Subpart Kb applies to "each storage vessel with a capacity greater than or equal to 75 cubic meters (m^3) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984." The largest storage tank located at the modified Marts Compressor Station that will store VOLs is now 3,000 gallons, or 11.4 m^3. Therefore, Subpart Kb does not apply to any storage tanks at the proposed facility.

40 CFR 60 Subpart JJJJ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.

ACP's proposed two (2) new 1,114 hp 4SLB Caterpillar G3512 emergency generators are each defined under 40 CFR 60, Subpart JJJJ as stationary spark-ignition internal combustion engines (SI ICE) and are, pursuant to §60.4230(a)(4)(iv), subject to the applicable provisions of the rule. Pursuant to §60.4233(e): "Owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 75 KW (100 HP) (except gasoline and rich burn engines that use LPG) must comply with the emission standards in Table 1 to this subpart for their stationary SI ICE." Therefore, as ACP's proposed emergency generators are greater than 100 hp, the engines each must comply

with the emission standards under Table 1 for "Emergency ≥ 130 hp:" NO_x - 2.0 g/HP-hr, CO - 4.0 g/HP-hr, and VOC - 1.0 g/HP-hr." The emission standards and the proposed compliance therewith of the engines are given in the following table:

Table 3: Caterpillar G3512 Subpart JJJJ Compliance(1)

Pollutant	Standard (g/HP-hr)	Uncontrolled Emissions (g/bhp)	Control Percentage	Controlled Emissions (g/bhp)	JJJJ Compliant?
NO_x	2.0	2.00	0.00%	2.00	Yes
CO	4.0	2.18	0.00%	2.18	Yes
VOC	1.0	0.33	0.00%	0.33	Yes

(1) Pursuant to Subpart JJJJ, VOC emissions do not include CH_2O emissions. Uncontrolled emissions represent the highest emission rate given on vendor data sheet at various loads. Therefore, the above emission rates may not be equal to those emission rates upon which the units' PTE is based on in Table 1.

Use of an emergency engine further requires compliance with the operating requirements given under §60.4243(d).

40 CFR 63 Subpart ZZZZ: Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

On June 1, 2013 the DAQ took delegation of the area source provisions of 40 CFR 63, Subpart ZZZZ. As the Marts Compressor Station is defined as an area source of HAPs (see Attachment A), the facility is subject to applicable requirements of Subpart ZZZZ. Pursuant to §63.6590(c):

> An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part.

§63.6590(c)(1) specifies that "[a] new or reconstructed stationary RICE located at an area source" is defined as a RICE that shows compliance with the requirements of Subpart ZZZZ by "meeting the requirements of . . . 40 CFR part 60 subpart JJJJ, for spark ignition engines." Pursuant to §63.6590(a)(2)(iii), a "stationary RICE located at an area source of HAP emissions is new if [the applicant] commenced construction of the stationary RICE on or after June 12, 2006." The Caterpillar G3512 emergency generators are defined as new stationary RICEs and, therefore, will show compliance with Subpart ZZZZ by meeting the requirements of 40 CFR 60, Subpart JJJJ. Compliance with Subpart JJJJ is discussed above.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

This section provides an analysis for those regulated pollutants that may be emitted from the revised Marts Compressor Station and that are not classified as "criteria pollutants." Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen (NO_x), Ozone, Particulate Matter (PM_{10} and $PM_{2.5}$), and Sulfur Dioxide (SO_2). These pollutants have National

Ambient Air Quality Standards (NAAQS) set for each that are designed to protect the public health and welfare. Other pollutants of concern, although designated as non-criteria and without national concentration standards, are regulated through various federal and programs designed to limit their emissions and public exposure. These programs include federal source-specific Hazardous Air Pollutants (HAPs) limits promulgated under 40 CFR 61 (NESHAPS) and 40 CFR 63 (MACT). Any potential applicability to these programs were discussed above under REGULATORY APPLICABILITY.

The majority of non-criteria regulated pollutants fall under the definition of HAPs which, with some revision since, were 188 compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects may cause cancer or other serious human health effects. The following table lists each HAP with a facility-wide PTE above 0.05 TPY and the associated carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)):

Table 4: Potential HAPs - Carcinogenic Risk

HAPs	Type	Known/Suspected Carcinogen	Classification
Acetaldehyde	VOC	Yes	B2 - Probable Human Carcinogen
Formaldehyde	VOC	Yes	B1 - Probable Human Carcinogen
n-Hexane	VOC	No	Inadequate Data
Toluene	VOC	No	Inadequate Data
Xylenes	VOC	No	Inadequate Data

All HAPs have other non-carcinogenic chronic and acute effects. These adverse health affects may be associated with a wide range of ambient concentrations and exposure times and are influenced by source-specific characteristics such as emission rates and local meteorological conditions. Health impacts are also dependent on multiple factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease) and lifestyle. As stated previously, *there are no federal or state ambient air quality standards for these specific chemicals.* For a complete discussion of the known health effects of each compound refer to the IRIS database located at *www.epa.gov/iris*.

AIR QUALITY IMPACT ANALYSIS

The estimated maximum emissions of the modified facility are less than applicability thresholds that would define the proposed facility as "major" under 45CSR14 and, therefore, no air quality impacts modeling analysis was required. Additionally, based on the nature and location of the proposed source, an air quality impacts modeling analysis was not required under §45-13-7.

MONITORING, COMPLIANCE DEMONSTRATIONS, REPORTING, AND RECORDING OF OPERATIONS

There were no substantive changes to the monitoring, compliance demonstration, reporting, and record-keeping requirements.

PERFORMANCE TESTING OF OPERATIONS

There were no substantive changes to the performance testing requirements.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates that compliance with all applicable state and federal air quality regulations will be achieved. Therefore, I recommend to the Director the issuance of a Permit Number R13-3271A to Atlantic Coast Pipeline, LLC for the proposed Class II Administrative Update of the Marts Compressor Station located near Jane Lew, Lewis County, WV.

Joe Kessler, PE
Engineer

5/18/17
Date

Attachment A: Facility-Wide PTE

Atlantic Coast Pipeline, LLC: Marts Compressor Station

Permit Number R13-3271A: Facility ID 041-00076

Emission Unit	EP ID	CO		NO_x		PM[1]		SO_x		VOC		Formaldehyde		Total HAPs	
		lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
Solar Titan 130[2]	CT-1	1.92	27.87	3.17	15.01	3.50	15.33	0.58	2.53	0.28	1.43	0.24	1.27	0.26	1.35
Solar Mars 100[2]	CT-2	1.58	20.73	2.61	12.35	2.90	12.70	0.48	2.08	0.23	1.14	0.20	1.02	0.21	1.09
Solar Taurus 70[2]	CT-3	1.06	13.08	1.78	8.40	1.90	8.32	0.32	1.41	0.16	0.78	0.14	0.68	0.14	0.72
Solar Taurus 60[2]	CT-4	0.80	8.45	1.33	6.28	1.50	6.57	0.24	1.06	0.12	0.56	0.10	0.50	0.11	0.53
Caterpillar G3512 EG	EG-01	4.57	0.23	4.91	0.25	0.08	0.01	~0.00	~0.00	1.08	0.05	0.42	0.02	0.66	0.03
Caterpillar G3512 EG	EG-02	4.57	0.23	4.91	0.25	0.08	0.01	~0.00	~0.00	1.08	0.05	0.42	0.02	0.66	0.03
Storage Tanks	TK-1, TK-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.45	0.00	0.00	0.00	0.00
Truck Loading	LR-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.25	0.01	0.00	0.00	~0.00	~0.00
Fugitives	FUG-01, FUG-02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	n/a	25.31	0.00	0.00	n/a	1.47
Facility-Wide Total →		***14.50***	***70.59***	***18.71***	***42.54***	***9.96***	***42.94***	***1.62***	***7.08***	***8.30***	***29.78***	***1.52***	***3.51***	***2.04***	***5.22***
Facility-Wide PTE[3] →		***14.50***	***70.59***	***18.71***	***42.54***	***9.96***	***42.94***	***1.62***	***7.08***	***8.30***	***4.47***	***1.52***	***3.51***	***2.04***	***3.75***

(1) All particular matter emissions are assumed to be 2.5 microns or less.

(2) Hourly emissions of CO, NO_x, VOC and Formaldehyde represent those during normal, non-low temperature operation. Much higher calculated hourly emissions may occur during low-temperature and turbine startup/shutdowns. Annual emissions represent input from all operating scenarios at permit limited operational hours.

(3) PTE does not include fugitive emissions. No individual HAP has a PTE over 10 TPY (formaldehyde is the largest contributor). As the PTE of all individual HAPs are less than 10 TPY the PTE of total HAPs is less than 25 TPY, the Marts Compressor Station is defined as a minor (area) source for purposes of 40 CFR 61 and 40CFR63.